REMARKS

Claims 1-43 and 54-62 are currently pending in this application. Claims 21-43, 56, 59 and 61 are withdrawn form consideration as directed to a non-elected subject matter.[1] Claims 1, 6, 8,19, 54 and 57 have been amended.

Claims 1, 6, 19 and 54 have been amended to clarify the abbreviation "DISC1" stands for "Disrupted-in -Schizophrenia 1" as specified, *e.g.*, at line 20 on page 4 of the application as filed.

Claims 6, 8, 19 and 57 have been amended to clarify that the probes and/or the primers of these claims hybridize to "a polymorphic region of a DISC1 allelic variant", rather than recite the phrase "capable of hybridizing" to which the examiner has objected.

Thus, no new matter has been introduced with these amendments. Entry and consideration of the amendments is therefore respectfully requested.

THE REJECTIONS UNDER 35 U.S.C § 101 SHOULD BE WITHDRAWN

Claims 1-20, 54, 55, 57, 58, 60-62 are rejected under 35 U.S.C 101 because the Examiner contends that the claimed invention is not supported by either *specific* and/or *substantial* utility or by a well established utility. In particular the Office Action indicates the disclosed use of DISC1 allelic variants of this invention is generally applicable to any nucleic acid molecule. As an example, the Examiner points out that the specification discloses the

[1] Applicants note that the Office Action actually states, on page 1, that only claims 21-43, 56 and 59 have been withdrawn from consideration. However, claim 61 is a species claim for kits that comprise a probe or primer of SEQ ID NO:35 whereas the DISC1/DISC2 polymorphism and primer sequences elected for prosecution are those set forth in SEQ ID NOs:33, 44 and 45, respectively. See, in particular, Applicants' response to Second Restriction Requirement filed on **November 25, 2002** for this application. Applicants therefore understand claims 21-43, 56, 59 **and 61** to have actually been withdrawn from consideration.

isolated nucleic acid molecule as useful as probes in hybridization reactions or primers in an amplification reaction to specifically identify variant forms of a gene; such as the genes recited in Table 5. The Examiner concludes that these are non-specific uses that are applicable to nucleic acids in general and are not particular or specific to the nucleic acids claimed.

In response, Applicants respectfully disagree with the Examiner and submit that the claimed invention has specific utility under 35 U.S.C 101. It is stated in MPEP § 2107.01 that "a claim to a polynucleotide whose use is disclosed simply as a "gene probe" or "chromosome marker" would not be considered to be specific *in the absence of a disclosure of a specific DNA target.*" In the specification, the DNA targets are the specific variants of the DISC1 gene disclosed in Table 5B. Since the claimed isolated nucleic acid and kit which comprises a nucleotide sequence of a polymorphic region of a DISC1 allelic variant can be used as a gene probe or a chromosome marker for variants disclosed in Table 5, the claimed invention has specific utility.

The Examiner also contends that the claimed invention is not supported by a substantial utility because no substantial utility has been established for the claimed isolated nucleic acid molecule or a gene product. The Examiner further points out that the specification fails to provide any evidence that the claimed allelic variances identified are associated with any neuropsychiatric disorders. Additionally, the Examiner contends that the specification appears to only *speculate* that the claimed allelic variants of the DISC1 gene are functional, since the DISC1 gene is purportedly known to be associated with neuropsychiatric disorders. The Examiner concludes that there is a need for further research to determine the function of the claimed allelic variants as correlated with neuropsychiatric disorder or a substantial utility.

Here, Applicants respectfully submit that the claimed invention actually has substantial utility in several applications that are described in the application as filed. It is stated in MPEP § 2107.03 that:

> "The applicant does not have to prove that a correlation exists between a particular activity and an asserted therapeutic use of a compound as a matter of statistical certainty, nor does he or she have to provide actual evidence of success in treating humans where such as utility is asserted. Instead, as the courts have repeatedly held, all that is required is a *reasonable correlation* between the activity and the asserted use. *Nelson v. Bowler, 626 F.2d 853, 857, 206 USPQ 881, 884 (CCPA 1980).*"

The DISC1/DISC2 polymorphisms of the present invention are all ones that were isolated for a population of individuals having a high presence of schizophrenia among family members. *See*, in particular, Example 1 at page 105, lines 20-28 and page 106, lines 1 and 2 of the application as filed. Hence, contrary to what is stated in the Office Action, there is *reasonable correlation* between the claimed allelic variances and neuropsychiatric disorders. Hence, the claimed invention does have specific and substantial utility in prognostic and diagnostic assays as well as in therapeutic applications as supported in the specification (*see* pages 77-90 and 92-98 of the application).

The present application additionally explains that knowledge of the identity of the allele of one or more DISC1 or DISC2 gene polymorphic regions in an individual, alone or in conjunction with information on other genetic defects contributing to the same disease also allows a customization of the therapy for a particular disease to the individual's genetic profile (pharmocogenomics) (*see* page 90, line 15 of the application). Hence, the polymorphisms of this invention additionally have a substantial utility in "pharmocogenomics", *i.e.*, in the "customization of the therapy" for individuals having a neuropsychiatric disorder.

The identification of different alleles of DISC1 or DISC2 is also useful for identifying an individual among other individuals from the same species, as described by the specification. *See* pages 98-103. For example, DNA sequences can be used as a fingerprint for the detection of different individuals within the same species, such as in forensic studies and paternity testing (*see* page 98, line 5 in the application). Hence, DISC1/DISC2 polymorphisms of this invention additionally have substantial utility in such forensic applications.

For all of these reasons, Applicants submit that the claimed nucleic acids of this invention do have a specific and substantial utility in accordance with 35 U.S.C § 101. Applicants therefore respectfully request that the rejections under 35 U.S.C § 101 be withdrawn.

THE REJECTIONS FOR ENABLEMENT UNDER 35 U.S.C. 112, FIRST PARAGRAPH SHOULD BE WITHDRAWN

The Examiner rejected claims 17-26 under the first paragraph of 35 U.S.C § 112, as not being enabled.[2] In particular, the Office Action indicates that the application does not enable a person skilled in the art to *use* the presently claimed invention. The Examiner bases this rejection on her assertion, when rejecting the claims under 35 U.S.C. § 101, that the claimed invention has neither specific nor substantial utility.

In response to this rejection, Applicants again point out that the claimed nucleic acids for this invention actually do have both specific and substantial utility as explained in detail,

[2] The Office Action states that the claims 17-26 have been rejected as lacking enablement. However, Applicants assume that a rejection of claims 1-20, 54, 55, 57, 58, 60-62 is actually intended since these claims have also been rejected under U.S.C § 101. Applicants additionally note that claims 21-26 have been withdrawn from consideration and therefore are not being examined in this application.

supra. Hence, Applicants submit that the rejections for enablement should be withdrawn since a skilled artisan will be able to use the invention, *e.g.*, in the applications discussed here.

THE WRITTEN DESCRIPTION REJECTIONS UNDER 35 U.S.C § 112, FIRST PARAGRAPH SHOULD BE WITHDRAWN

Claims 1-20, 54, 55, 57, 58 and 60-62 are rejected under 35 U.S.C. 112, first paragraph, as lacking adequate written description in the application as filed. In particular, the Examiner has asserted that the specific example of DISC1/DISC2 polymorphisms described in the application (*e.g.*, at page 114, Table 6) do not adequately support generic claims for a polymorphic region of a DISC1/DISC2 allelic variant. The Applicants respectfully traverse this rejection and submit that such generic claims are indeed adequately supported in the application as filed.

The written description requirement of 35 U.S.C § 112, first paragraph, is satisfied if a skilled artisan would have understood the inventor(s) to be in possession of the claimed invention at the time the application was filed. *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563, 19 USPQ2d 1111, 1116 (Fed. Cir. 1991). For claims directed to a genus, *e.g.*, of DISC1 SNPs or other polymorphisms, written description can be satisfied " through sufficient description of a representative number of species". *See* MPEP § 2163. It is stated in MPEP § 2163 that:

> "[w]hat constitutes "a representative number" is an inverse function of the skill and knowledge in the art. Satisfactory disclosure of a "representative number" depends on whether one of skill in the art would recognize that the applicant was in possession of the necessary common attributes or features of the elements possessed by the members of the genus in view of the species disclosed."

Given what is thought in this application as filed, one who is skilled in the art will be able to identify SNPs and/or other polymorphisms in a DISC1 gene and can determine whether such polymorphisms are associated with a neuropsychiatric disorder (for instance, schizophrenia) as described in the Examples of this application. In view of the above remarks, Applicants respectfully submit that the Written Description rejection has now been obviated and should be withdrawn.

THE REJECTIONS UNDER 35 U.S.C § 112, SECOND PARAGRAPH SHOULD BE WITHDRAWN

Claims 1-20 and 54, 55, 57, 58, 60-62 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. In particular, the Examiner has objected to several informalities and/or choices of phrasing in those claims.

Applicants respectfully point out that Claims 1, 6, 8, 19 and 57 have been amended as the Examiner has suggested and submit that these amended claims are fully definite.

First, the Office Action objects to the abbreviation "DISC1" used in the claims 1-20 and 54, 55, 57, 58, 60-62. The Examiner suggests that the full name of the abbreviation is inserted into the independent claims 1, 6, 19 and 54 as supported by the specification. (*see* page 4, line 20 of the application). Claims 1, 6, 19 and 54 are amended to recite the full name of DISC1.

The Examiner also found the recitation of "capable of" to be indefinite and requests (at lines 9 and 10 on page 10 of the Office Action) changing "capable of hybridizing" to "which hybridizes" or some other positive, active language as supported in the specification. The suggested amendments have been made in claims 6, 8, 19 and 57.

For all the above reasons, Applicants believe that the pending claims, as amended, are fully definite. Applicants therefore respectfully request that the rejections under 35 U.S.C. § 112, second paragraph, be withdrawn.

CONCLUSION

For the reasons stated above, Applicants believe that all of the outstanding rejections to this application have been overcome and/or obviated, and that the claims are in condition for allowance. The withdrawal of all rejections, and reconsideration of the application are therefore respectfully requested. Applicant respectfully requests that a Notice of Allowance be issued in this case.

Respectfully submitted,

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